

Targeted Commercialization: Technology Transfer as an Element of Economic Development

By David Tralli

The transfer and commercialization of technology from academic institutions and federal laboratories to private sector firms can provide a stimulus to regional economic development. In order to do so, the underlying research and technology development programs must be strategically designed to target growth and emerging market segments.

The growth of a global economy has forced U.S. firms to respond ever more rapidly and competitively to changes in supply and demand. This has shortened product life cycles, in turn reducing research and development and product engineering times, and fundamentally decreasing the time horizon for capturing gains from investment. In a strategically managed organization, research and development, and product design and engineering, must efficiently and effectively meet the needs of the market. Invention that comes from targeted research and development is, by design, more likely to be responsive to global market forces.

As a model for technology transfer, targeted commercialization focuses on market-driven technology development for commercial applications. The intent is to secure private sector research and development dollars and investment capital that leverages the federal dollars invested for basic research, science and engineering. Patenting and licensing, traditionally viewed as the core functions of technology transfer, are encompassed within the commercial technology development framework. The model calls for accurate market research and intelligence, forecasting, technology assessment and intellectual property management. The aggregate benefit of technology developments within targeted programs is high through the leveraging of financial and organizational resources.

Lastly, a discussion on technology would be incomplete without a brief mention of the role of the entrepreneur. Peter Drucker, in *Innovation and Entrepreneurship*, describes the entrepreneur as always searching for change, responding to it, and exploiting it as an opportunity. Joseph Schumpeter, in *The Theory of Economic Development*, conceptualized the entrepreneur as the fundamental cause of economic development, rather than as a reactor to changes brought about by market forces. In his framework, economic

development results from discrete changes through such elements as new product development, new methods of production, market creation and industrial reorganization. Regardless of viewpoint, the impact of technology development can only benefit from fostering an entrepreneurial culture within the organization.

In summary, technology transfer as a viable element of economic development calls for research and development that targets growth and emerging global market opportunities, and which in certain cases may actually create markets. The key to successful implementation of the targeted commercialization model is strategic positioning - the financing, marketing and management of a technology in a manner that increases the likelihood that it will lead to an innovative product or service in the right market place and at the right economic time.

Dr. David Tralli is Manager of the Targeted Commercialization Office of the Jet Propulsion Laboratory (JPL). The Office works with the private sector to maximize the impact of technology development at JPL for commercial applications. The Office leverages the U.S. investment in space exploration by transferring technologies to diverse industry sectors. Current commercial technology development programs that are strategically designed and managed by the Office include medical imaging and sensors; airborne and satellite remote sensing; and telecommunications. The Jet Propulsion Laboratory is managed by the California Institute of Technology, under contract to the National Aeronautics and Space Administration.

benefit through the availability of more and higher-quality multimedia services to their homes.

The Forecast also posited that the wireless industry will grow by becoming the primary telephone -- replacing the wireline for local telephone access service. This transition can be achieved by a combination of prices and services, such as two-way messaging combined with voice, and unmetered cordless telephony at home combined with cellular-like service outside the home.

As we look ahead at the rapidly evolving telecommunications industry, customer care and management will become one of -- if not the most -- powerful differentiating factors for telecommunications companies. Various competitors will look to offer bundled packages of services -- including long-distance, local and cellular phone service; Internet access; cable television; movies on demand and more.

With so many services to offer, these companies will need to develop "customer-centric" operations, including user-friendly billing systems and highly advanced demographic tools so that they can tailor special packages of services for particular customers.

And they must pull it all off as smoothly as possible. Because in the end, it won't be merely technology that wins. It will be market-focused technologies and services developed with a specific consumer in mind.



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Healthy Prognosis for the Future

By William Bold

In the past decade, the technologies for collecting, storing and communicating data have rapidly changed American business. The health care technology industry, for example, has benefited from sophisticated computer modeling systems that analyze protein structures in three dimensions, and programs that conduct complicated biochemical analyses quickly and efficiently.

But the practice of medicine has been slow to capitalize on these informational advances. Despite the advent of high-performance computing and the Internet, both clinical and administrative types of health information are still stored and conveyed primarily in paper form. Telemedicine is broadly defined as the transfer of this crucial information in digital form, facilitating appropriate patient care regardless of geographic boundaries.

The societal benefits of telemedicine are clear. Today, two patients with advanced-stage heart disease -- one living in rural Idaho, and one in metropolitan Los Angeles -- will likely receive radically different treatment regimens and experience different outcomes. In a far-flung vision of telemedicine, the community doctor in Idaho could receive diagnoses, tutoring

and coaching from physicians at Cedars-Sinai through satellite communications and video conferencing. This tantalizing potential has convinced federal and state policy makers to commit significant resources to telemedicine in the form of demonstration projects. In Texas, telemedicine is being used in the prison system, where patients are examined by use of video-conferencing equipment by doctors and specialists located at urban hospitals. In January 1995, Stanford University began performing weekly teleradiology overreads for Singapore General Hospital.

The UCLA Telemedicine Program's website documents a case in which a single SOS message from Beijing posted to physicians' news groups on the Internet yielded 84 different correct diagnoses of a thallium poisoning case that had baffled Chinese physicians. Physicians at American institutions then used the Internet to query the latest treatments for this disorder, and, through a series of referrals, brought the case to a board-certified toxicologist in the U.S. who had treated a light thallium-poisoning case earlier that year. After months of treatment and on-

keep customers happy [O]penate the local markets. It will also permit cable companies and other utilities to sell local phone service, further fueling the market. In addition to the healthy competition that deregulation will foster, the industry is at a technological pinnacle. The two factors combined will give us high-tech tools that offer a range of capabilities all at an affordable price. New technology and companies broadening into other segments of the market will create tens of thousands of good paying,

manner that fosters growth, our decisions will be reflected in a thriving industry worthy of the 21st Century we have created in our theme parks and sci-fi movies.



Assembly Majority Leader James E. Rogan represents the 43rd District, which includes Glen Ale, Burbank and parts of Las Angeles.

line consultation, the patient regained consciousness, and is today slowly recovering from her debilitating illness.

The trick for policy makers and the private health care market will be how to remove the structural barriers that constrain the flow of medical information and clinical and diagnostic expertise. A recent Office of Technology Assessment (OTA) report identified cost, availability, privacy and [the] compatibility of communications systems as obstacles to widespread deployment of telemedicine.

Another looming obstacle is the lack of consistent reimbursement policies for telemedicine services by the Health Care Financing Administration (HCFA), private insurers, and state Medicaid programs. Both public and private payers are reluctant to set reimbursement levels without more information about the costs and the effectiveness of specific telemedicine procedures and applications. In the absence of predictable reimbursement policies, telemedicine programs will for the near future be restricted to federal and state demonstration grants financed through public monies.



William Bold is the Director of Public Policy for the California Health Care Institute (CHCI), a statewide public policy research and advocacy institute representing California's leading academic biosciences research, biotechnology, medical device and pharmaceutical organizations.



I have been involved with The Futurist Conferences since they first began several years ago and am well aware of their value in keeping our state in the vanguard of the dynamic global economy. As with biotechnology and electronics, California is also poised to lead the nation and world in telecommunications. So I salute all of you who are working so hard to ensure this industry's continued success.

Sincerely,

Gray Davis

Gray Davis, Lieutenant Governor